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DESIGN AND FABRICATION OF BLUETOOTH SOLAR GRASS TRIMMER

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DESIGN AND FABRICATION OF BLUETOOTH SOLAR GRASS TRIMMER

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Thesis submitted in fulfilment of the requirements
for the award of the degree of
Bachelor of Engineering Technology in Manufacturing with honours

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STATEMENT OF AWARD FOR DEGREE

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SUPERVISOR'S DECLARATION

We hereby declare that we have checked this thesis and in our opinion, this thesis is adequate in terms of scope and quality for the award of degree of Bachelor of Engineering Technology in Manufacturing.

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Date: JANUARY 2019

STUDENT'S DECLARATION

I hereby declare that the work in this thesis is my own except for quotations and summaries in which have been duly acknowledged. The thesis has not been accepted for any degree and is not concurrently submitted for award of other degree.

Signature:
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ABSTRACT

Gas powered lawn mower are one of devices that contribute to the pollution especially air pollution. If using electrical powered, for sure it consumes large amount of energy for the working to move the cutting blades and the wheels. For the solution to nowadays problem as the mowers use fuel which could pollute the environment and produce lousy noise, this project is implemented with the objective to design and fabricate a Bluetooth Solar Grass Trimmer that easy to handle. A solar powered grass trimmer controlled by Bluetooth device with a systematic photovoltaic (PV) solar system was built in together with the trimmer as the source to reduce the manpower and usage of electricity. The process start by identify the problems occurred in the community. Then, proceed with the design constructed by using NX10 and choosing the right material for the trimmer. The materials were assembles to build the trimmer and were test at the field. After done the assembly part and the program are successfully installed, Bluetooth Solar Grass Trimmer is able to move forward and reverse by using dc geared motors. After that, the battery needs to be recharge again to power up the Arduino and motor driver. The grass trimmer also can be control by using the RC Bluetooth Controller. The application can be downloaded in the android phone. It is easier as it can be control from afar and safe for the children. The idea of invented Bluetooth Solar Grass Trimmer now can be used in home lawn area as it is portable and can be operates without human energy.

ABSTRAK

Pemotong rumput berkuasa gas adalah salah satu alat yang menyumbang kepada pencemaran terutama pencemaran udara. Sekiranya menggunakan kuasa elektrik, sudah pasti ia menggunakan sejumlah besar tenaga untuk bekerja untuk memindahkan bilah memotong dan roda. Untuk penyelesaian masalah saat ini kerana pemotong rumput menggunakan bahan bakar yang dapat mencemarkan alam sekitar dan menghasilkan bunyi bising, projek ini dilaksanakan dengan tujuan untuk mereka dan membina mesin rumput Bluetooth berkuasa solar yang mudah diatasi. Mesin rumput berkuasa solar dikawal oleh peranti Bluetooth dengan sistem solar photovoltaic (PV) sistematik dibina bersama-sama dengan pemotong sebagai sumber untuk mengurangkan tenaga manusia dan penggunaan elektrik. Proses ini bermula dengan mengenal pasti masalah yang berlaku di dalam masyarakat. Kemudian, proses diteruskan dengan reka bentuk yang dibina menggunakan NX10 dan memilih bahan yang sesuai untuk pemotong. Bahan-bahan itu dipasang untuk membina pemotong dan diuji di lapangan. Setelah selesai pemasangan unit dan program ini berjaya dipasang, mesin rumput Bluetooth berkuasa solar dapat bergerak maju ke hadapan dan ke belakang dengan menggunakan gear motor dc. Selepas itu, bateri perlu dicas semula untuk menghidupkan Arduino dan pemandu motor. Pemotong rumput juga boleh dikawal dengan menggunakan Alat Kawalan Bluetooth RC. Aplikasi boleh dimuat turun di telefon android. Ia lebih mudah kerana ia boleh mengawal dari jauh dan selamat untuk kanak-kanak. Idea untuk mencipta mesin rumput Bluetooth berkuasa solar kini boleh digunakan di kawasan rumput rumah kerana ia mudah alih dan boleh beroperasi tanpa tenaga manusia.

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LIST OF SYMBOLS

cm	Centimeter
V	Voltage
m	Meter
mm	Millimeter
min	Minute
Ah	Ampere hour
Amp	Ampere
Rpm	Revolutions per minute
S	Second
W	Watt
Nm	Newton meter
Kg	Kilogram

LIST OF ABBREVIATION

SDP	Senior design project
PV	Photovoltaic
DC	Direct current
AC	Alternating current
RPM	Revolution per minute
EMF	Electromotive force
SLA	Sealed lead acid
AGM	Absorbent glass mat

1.0 INTRODUCTION

1.1 PROJECT BACKGROUND

In the time where technology is merging with environmental awareness consumers are looking for ways to contribute to the environment by using devices with eco-friendly technology to decrease the pollution and protect the nature. Pollution is manmade and might be seen in our own daily lives, a lot of specifically in our own homes. Mostly, gas powered lawn mower are one of devices that contribute to the pollution especially air pollution. If using electrical powered, for sure it consumes large amount of energy for the working to move the cutting blades and the wheels. Nowadays, all the creation and new devices going under automation so our team tried to reduce the human effort for the trimming job.

The design objective is to come up with a grass trimmer that is portable, durable, easy to operate and maintain. It also aims to design a self-powered trimmer of electrical source which is a cordless electric grass trimmer. The heart of the machine is a battery-powered BLDC electric motor. The use of cable tie as blade makes the design unique such that less energy is needed for the motor to spin the blade. Thus, the machine is considered highly efficient as it uses no human effort and is readily adaptable to cutting conditions.

Our team would create solar grass trimmer which is efficient, less noisy and portable. The basic idea is that the grass trimmer is made with electric motor that runs from a 12-volt battery. This battery will be charged using solar panel of 30W on the grass cutter. This grass trimmer uses a solar based energy source which is easier to use, more advantageous comparing to other energy source. This grass trimmer is based on solar because this energy is a renewable energy source and it is easy to work. So this solar powered grass trimmer is build with the advantages as it is safe to use, efficient and environmentally friendly and for sure it saves on labor costs.

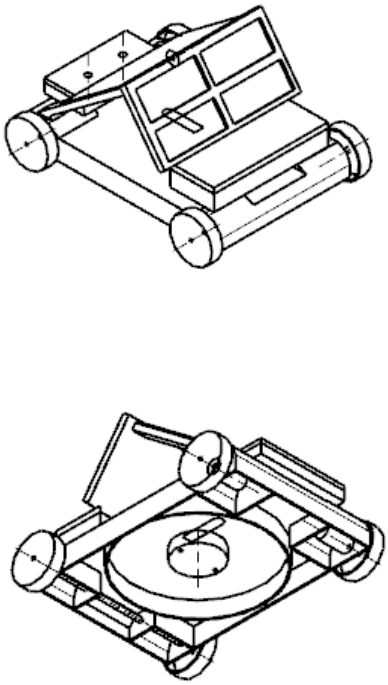

Figure 1.1 Design of Bluetooth Solar Grass Trimmer

1.2 PROBLEM STATEMENT

Nowadays, most of the activities which included human efforts are either replaced or automated by the use of machines or other kinds of equipment. The present technology commonly used for cutting the grass is by using the manually handle device which inconvenience due to heavy machines to carry and required human effort for proper handle. Solar grass trimmer is one the machines for public appliance provided to reduce human effort for mowing job. It uses blade to cut the grass, there are many grass cutting machine was built and introduced by industry, in this case to use and choosing the right power supply before implementing this project, there are various of battery that exist and we need to choose the most suitable type of source in order to complete the project based on the idea of portable and Bluetooth grass cutter. In order to build our own project, it still uses the same technology in term of power supply but need to decide the most suitable that can be used, it is the same in choosing the type of solar panel that will be used as this project is using a sustainable energy which is solar power. There are few problem statements for this project:

i. The usage of fuel grass cutter can caused pollution.
ii. It is noisy to use a grass cutter by a fuel usage.

In the time where technology is merging with environmental awareness, consumers are looking for ways to contribute for reducing the cause of pollution. By switching to modern technology from traditionally aspect, the implementation of solar trimmer devices is more environmental friendly compared to old cutting devices which can contributes to air pollution due to the internal combustion of engine. Therefore, solar grass trimmer devices are more preferable where the energy can be supplied from sunlight that absorbed by the solar panel to generate electricity.

Besides, the traditional lawn mower will consume engine oil in their fuel combustion to generate energy which generally creates byproducts and harmful pollutants. Thus, the energy efficiency can be achieved with the help of motor by using the solar energy. The grass trimmer devices is solar powered which the battery can be charge manually from main supply Hence, the energy consumption can be reduced and

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